Estrutura de Capital Como Determinante das Oportunidades de Crescimento nas Companhias Listadas na B3

Capital Structure as a Determinant of Growth Opportunities in Companies Listed on B3

Estructura de Capital como Determinante de Oportunidades de Crecimiento en Empresas Listadas en B3

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PALAVRAS-CHAVE
Oportunidades de crescimento
Estrutura de capital
Market-to-book
Q de Tobin
Endividamento

Resumo: Essa pesquisa propõe-se a analisar como a forma que a companhia se endivida influencia suas oportunidades de crescimento. Os dados coletados referem-se às empresas listadas na [B]3, sendo considerado o período de 2009 a 2020. Utilizar-se-á regressão múltipla, por meio de dados em painel com série temporal empilhada, tendo como variável dependente as oportunidades de crescimento, medida por meio do índice Market-to-book (MB) e Q de Tobin (Q), e como variáveis independentes o Endividamento, Tamanho, Retorno sobre o ativo (ROA), Crescimento da Receita e Despesas de Capital (CAPEX). O modelo do Market-to-book foi melhor explicado do que o modelo Q de Tobin pelas variáveis escolhidas. Nos dois modelos o endividamento e a rentabilidades (ROA) foram as variáveis com maior sensibilidade às oportunidades de crescimento. Empresas endividadas apresentaram melhores oportunidades de crescimento.

KEYWORDS
Growth opportunities
Capital structure
Market-to-book
Tobin's Q
Indebtedness

Abstract: A variety of empirical studies tried to explain the determinants of the capital structure of organizations. This research aims to analyze how the way a company indebted itself influences its opportunities to grow. The data collected refer to companies listed on [B]3, considering the period from 2008 to 2020. It will be used multiple regression, using panel data with a stacked time series, with growth opportunities as the dependent variable, measured using the Market-to-book (MB) and Tobin's Q (Q) index, and as independent variables, Debt, Size, Return on Assets (ROA), Revenue Growth and Capital Expenditure (CAPEX). The Market-to-book model was better explained than Tobin's Q model by the chosen variables. In both models, indebtedness and ROA were the variables with greater sensitivity to growth opportunities. Indebted companies presented better growth opportunities.

Resumen: Esta investigación se propone analizar cómo la forma en que la empresa se endeuda influye en sus oportunidades de crecimiento. Los datos recolectados se refieren a las empresas listadas en [B]3, considerando el período de 2009 a 2020. Se utilizará regresión múltiple, utilizando datos de panel con series de tiempo apiladas, teniendo como variable dependiente las oportunidades de crecimiento, medidas a través del Market-to-book (MB) y el índice Q de Tobin (Q), y como variables independientes Deuda, Tamaño, Retorno sobre Activos (ROA), Crecimiento de Ingresos y Gastos de Capital (CAPEX). El modelo Market-to-book se explicó mejor que el modelo Q de Tobin por las variables elegidas. En ambos modelos, el endeudamiento y la rentabilidad (ROA) fueron las variables más sensibles a las oportunidades de crecimiento. Las empresas endeudadas presentaron mejores oportunidades de crecimiento.

Introdution

62 years ago, the American Economic Review published an article that would influence profoundly how financial problems would be addressed over the next six decades. The article by Modigliani and Miller (1958) is recognized as the cornerstone of modern finance theory, as the authors, contrary to scholars at the time, stated that the capital structure does not affect the value of companies.

Many subsequent studies attempted to list the factors that determine the capital structure of companies (Mcconnell & Muscarella, 1985; Myers, 1974; Stulz, 1999; Titman & Wessels, 1988) and among these factors, the ones that stood out the most were: i) company size, ii) profitability, iii) growth opportunities and iv) the volatility of operating results. Although the subject has been discussed in the academia for a long time, the difference between the empirical evidence indicates that the subject has not been fully explored (Brito, Corrar, & Batistella, 2007).

Many studies (Bastos & Nakamura, 2009; Brito et al., 2007; Cecon, Moretti, Rodrigues, & Kroenke, 2017; Chen, 2004; Huang & Song, 2006; Kim & Sorensen, 1986; Rajan & Zingales, 1995; Wald, 1999) have performed regressions using the capital structure as the dependent variable. In these surveys, growth opportunities are usually just one of the independent variables that will affect indebtedness. Given this fact, this study aims to verify the opposite: the growth opportunities relationship with indebtedness. However, the great challenge for scholars is to find the best proxy for growth opportunities.

Determining which is the best indicator of growth opportunities has created discussions, as there are many variables, often not measurable, that can affect it. When analyzing the reality of Brazilian market, with its particularities of an emerging country, there is a greater volatility in the results, and there may be several endogenous and exogenous factors that affect growth. Thus, for comparison viability, the present study chose two variables which are pointed out, in the literature, as determinants of growth opportunities.

Researches in the area showed different methodologies that address growth opportunities more broadly: Market-to-book (Almeida, Sousa, & Rodrigues, 2009; Booth, Aivazian, Demirguc-Kunt, & Maksimovic, 2001; Chen & Zhao, 2006; Rajan & Zingales, 1995) e Q de Tobin (Kim, 2014; Mcconnell & Servaes, 1995; Morck, Shleifer, & Vishny, 1988; Richardson, 2006; Shin & Stulz, 2000; Tobin, 1969). According to Serra and Saito (2016) there is a large number of studies involving the Market-to-book, however, it is focused on the relationship with profit, creating a gap in relation to other determining factors, such as structure capital, growth, risk and size.

Given this reality, this study aims to analyze how the way in which a company gets into debt influences its growth opportunities. Which would be the most effective way of measuring growth opportunities was not very objectively defined. In addition, empirical evidence can contribute establishing more efficient management policies and maximizing companies' wealth, optimizing the use of resources, an indisputable interest for investors.

Thus, this research aims to analyze the relationship between capital structure indicators and growth opportunity indicators, defining the following research problem: what is the relationship between capital structure indicators and opportunity of growth of companies listed in [B]3?

The study is justified by complementing the existing literature on the subject, in addition to the fact that discussing opportunities for growth at the national level is relevant. Furthermore, for Brito et al. (2007), the capital structure of companies is one of the main subjects studied in the scope of Corporate Finance, making the relationship interesting to be studied.

The difference between other researches is also indicated by the number of variables used in the model, with 5 financial indicators to analyze the relationship between each of them and the growth opportunities of the companies listed in [B]3. The indicators used were not jointly discussed in other studies used in the study.

Moreover, the importance of this study is justified by the importance of Economic-Financial Analysis, since one of the main questions of investors is the economic value of companies. Thus, a relationship between financial indicators and growth opportunities may be of interest to users of financial statements, having analysts and investors as their main target.

Among the main contributions of this study, the following stand out: i) provide evidence on growth opportunities of companies listed in [B]3; ii) contribute to the capital structure literature. As main results, the research shows that company size is inversely proportional to growth opportunities.

Theoretical reference

Evolution of Studies on Capital Structure

Questions involving capital structure began with the irrelevance propositions of Modigliani and Miller (1958, 1963). According to these authors, the value of companies would not change, regardless of the structure of their funding sources. Since then, many scholars have researched to find out if there is an optimal capital structure and what are the determinants of this structure.

Many studies contradicted the position of Modigliani and Miller. Among theories raised, the following stand out: the theory of trade-off, pecking order and agency. The trade-off theory refers to the existence of an optimal capital structure, that is, an optimized combination of equity and debt capital, capable of maximizing the company's value. Cash flows from shareholders' equity (dividends) are not deductible from income tax, whereas interest expenses are (David, Nakamura, & Bastos, 2009). It is the debts with third parties precisely that originate interest and Modigliani and Miller (1963) observed that the greater the company's leverage, the lower the amount of income tax paid.

Thus, companies seek an optimal indebtedness point

considering both the tax benefit and the costs of financial difficulties. Myers (1984) analyzes the trade off theory showing that, as the company increases its indebtedness, it also increases its tax benefit, consequently increasing its value. However, as indebtedness increases, the costs of financial difficulties also increase, so, for this theory, the company must measure the impacts of the tax benefit and financial difficulties, in a way that it reaches a debt point that maximizes company value (Bastos, Nakamura, & Basso, 2009).

Pecking order theory assumes that capital structure of companies is based on the hierarchy of funding sources, that is, the proposition that companies prioritize the use of one source over another. Initially proposed by Myers (1984) and Myers and Majluf (1984), it considers that managers, hierarchically, opt for internal financing, followed by loans and, finally, by issuing new shares. According to Myers (1984), the pecking order theory does not prescribe a "well-defined" or optimal level of indebtedness. Internal cash flows and investment opportunities change the level of indebtedness, so changes in debt ratios are driven by the need for external funds rather than any attempt to achieve an optimal capital structure (Shyam-Sunder & Myers, 1999).

Fama and French (2002) verified that the trade-off and pecking order models explain the financing behavior of some companies and none of them can be rejected. Booth et al. (2001) point out that empirically distinguishing the two models proved to be difficult, because the variables that describe one model can also be classified in the other. Myers (2003) states that all capital structure models are conditional and that there is no universal theory of capital structure and no reason to expect one. In part because of this, many recent empirical studies have employed cross-section tests and a variety of variables that can be justified using either model.

Another theoretical line that has served as a basis for trying to explain companies' financing decisions is the agency theory. The agency theory is based on the relationship between principal and agent, in which the first hires the second to perform some type of service (Jensen & Meckling, 1976). In this case, shareholders hire managers so that companies are managed in the best way, generating maximum profit. However, if each of the parties is left to themselves, they will seek to act in defense of their own interests. Thereby, in seeking to maximize its utility, the actions of the agent (managers) do not always meet the interests of the principal (shareholder), thus generating agency conflicts. Such conflicts generate agency costs, due the search to resolve divergences of interests between managers and shareholders.

According to Jensen (1986), an important consequence of the agency theory is the analysis of the capital structure, that is, from a certain level of indebtedness, a given company could have more growth opportunities. It can happen, however, that a residual cash flow will increase the administrator's arbitrary behavior. Thus, the author defends a higher level of indebtedness, since it forces managers to be more efficient, making their decisions less arbitrary. However, the flexibility that the company has in maintaining low levels of financial leverage is lost, which may compromise the need for flexibility for decision-making in future periods (Bastos et al., 2009).

Although indebtedness is a solution, Damodaran (2002) explains that debt can have a beneficial effect to some extent, as at some point the risk resulting from leverage may be so great that managers may become reluctant to take on more insignificante risks, for fear of bankruptcy and failing when investimg in good projects. Thus, one of the assumptions of agency theory is the negative relationship between growth opportunities and financial leverage (Mendes, Basso, & Kayo, 2009). For example, when a business reaches maturity, growth opportunities become small and the use of third-party capital is predominant. Empirical evidence from the studies by Lang, Ofek and Stulz (1996) supports this proposition.

Growth Opportunities and Measures

The relationship between growth opportunities and financing policies is one of the main issues in corporate finance (Chen & Zhao, 2006). The underlying construction of growth opportunities refers to the present value of a company's options to make future investments (Myers, 1977). To Rajan and Zingales (1995) highly leveraged companies are more likely to miss out on valuable investment opportunities as companies that expect high future growth should. Largely finance themselves with equity, leads to a negative relationship between this variable and leverage.

For Gomes (1999), according to the pecking order theory, there should be a positive relationship between the level of growth and the indebtedness of companies, since companies with the highest growth rates would tend to seek outside these resources necessary for expansion, as that would require more funds than they can generate internally. Thus, companies with high growth rates may not optimize their investments, and lenders may be reluctant to lend long-term resources to the companies (Myers, 1977). It should be noted that growth opportunities are assets that add value to a company, but cannot be secured against debt and do not generate taxable income. (Titman & Wessels, 1988).

In this way, future growth opportunities can be seen as a form of intangible assets. Companies that have future growth opportunities tend to borrow less than companies that have more tangible assets, because growth opportunities cannot be taken as guarantee. (Chen, 2004). The use of debt would be limited for these companies, which indicates that growing companies should be less indebted according to the trade-off theory (Correa, Basso, & Nakamura, 2013). Furthermore, fast-growing companies constantly need new investments, and the cost of not investing due to lack of resources is quite high. As a result, companies would tend to keep their indebtedness lower in order to be able to raise funds if they turn out.

Managers who have the best growth opportunities in their hands have more flexibility to invest, even if this investment is not great (Chen, 2004). Therefore, according to agency theory, they expropriate shareholder wealth for creditors (Jensen, 1986). Having continuous growth

opportunities implies a conflict between debt holders and equity holders (Chen, 2004). There are theoretical arguments that justify both a positive and a negative relationship between the level of indebtedness and growth opportunities. In this research, two different methodologies will be used as a measure of the companies' growth opportunity: i) Tobin's Q, ii) Market-to-book.

Developed by Tobin (1969), Tobin's Q is a neoclassical representation of how great investment opportunities can be summarized by the market valuation of a company's stock. Tobin's Q (the ratio of assets' market value to the current replacement cost of those assets) is the most widely used measure of growth opportunities (Richardson, 2006). Huang and Song (2006) define Tobin's Q as the market value of equity plus the book value of liabilities divided by the book value of total assets. In the studies by Shin and Stulz (2000) and Taghavi, Valahzaghard and Amirjahadi (2014), the authors use Tobin's Q according to Equation (1):

Tobin's Q =(VM+VCD)/TA   (1)
Where:
TA = total assets
VCD = book value of debts (long term + short term)
VMA = Market value

In this context, for Famá and Barros (2000), the Q-marginal can be interpreted as an important indicator of growth opportunities for the company. The authors address the strategy in which the company will continue to invest in projects for q > 1 and for q < 1 the company will have to carry out divestments until the balance is re-established. When Q is low in companies, authors such as Mcconnell and Servaes (1995) show that managers will tend to apply resources, when available, in projects with negative net present value, consequently compromising shareholder wealth. According to the agency theory, deviant management behavior creates a conflict of interest between managers and shareholders, leaving the maximization of shareholder wealth in the background.

An usual approach in the literature has been to use the market price in relation to some fundamental value measure to determine growth opportunities (Richardson, 2006). The Market-to-book index has been a frequent subject of study in Economics, Finance and Accounting (Hand, 2001). It can be seen as a close empirical substitute for Tobin's Q. The Market-to-book index shows the relationship between the market value of a company and the book value of equity (Book value) (Almeida et al., 2009). Some companies may present this index much higher than the book value and historical value, while others may demonstrate the opposite, which means, be worth less than what is recognized in Accounting.

When analyzing the Market-to-book index, there is a possibility of obtaining two distinct results. The first is values greater than one, showing that the market recognizes that a certain firm has a value greater than what is recorded in its financial statements, that is, the market is recognizing something that is not being properly recorded by Accounting. The second result occurs when the index is less than one,

meaning that the market is not properly recognizing the amounts expressed in the company's financial statements.

It is considered that, for a company to maintain its market value (Market value) greater than its book value, it needs to present results to create expectations of future cash flow for its shareholders and agents with some interest on the firm (Almeida, Lopes, & Corrar, 2011). Consequently, this may directly reflect on the value of the shares causing the market value to be greater than the book value of a company. The Market-to-book index equal to 1 is an indication that the market value is equal to the book value. When this measurement increases, it indicates that the market recognizes a higher value than Accounting can measure or, if it is the opposite, it is worth less than Accounting recognizes.

Market-to-book is considered an indicator that measures growth opportunities in a company, as it moderates Tobin's Q assumptions that information in the capital market is perfect and because it stores the market's informational asymmetry and financing restrictions explaining the variation in investment decisions to maximize value (Hand, 2001). Chen and Zhao (2006) explain that companies with the highest Market-to-book index (more growth opportunities) face significantly lower borrowing costs. Also, for companies with a low or medium Market-to-book ratio, the benefits of borrowing are greater than issuing new equity debts. On the other hand, companies with a high Market-to-book ratio have great growth opportunities and preserving low indebtedness ratios becomes a major concern. For Rajan and Zingales (1995) companies with high Market-to-book indexes are overestimated and, as a consequence, issue more shares to take advantage of this.

Related Studies

Theoretical studies generally suggest that growth opportunities are negatively related to leverage. Empirical studies such as Booth et al. (2001), Kim and Sorensen (1986), Rajan and Zingales (1995), Smith and Watts (1992) and Wald (1999) support predominantly the theoretical prediction. There are different proxies for growth opportunities. Wald (1999), for example, uses an average of 5 years for sales growth. Titman and Wessels (1988) use capital investment scaled by total assets as well as research and development (R&D) divided by sales. On the other hand, for Chen (2004), growth opportunities are represented by sales growth over total asset growth. Booth et al. (2001) and Rajan and Zingales (1995) use the Market-to-book relationship to measure growth opportunities. Kim (2014), McConnell and Servaes (1995) and Morck et al. (1988) use Tobin's Q as a proxy for a company´ market value or growth opportunities. From another perspective, Huang and Song (2006) believe that sales growth rate is a past growth experience, while Tobin's Q representes better future growth opportunities.

McConnell and Servaes (1995) examined a large sample of US non-financial firms for the years of 1976, 1986, and 1988. For each year, it was separate samples into two groups, those with strong growth opportunities and those with weak growth opportunities. It was shown that

corporate value is correlated negatively with leverage for companies with strong growth opportunities (indicated by high Tobin's Q) and positively correlated with leverage for companies with weak growth opportunities (or low Tobin's Q).

Jensen (1986), aligned with the agency theory, argues that companies with more growth opportunities have lower free cash flow and, consequently, pay lower dividends. Althugh for companies that do not have investment opportunities, debt serves to limit management agency costs. (Jensen, 1986; Stulz, 1990). The findings of Berger, Ofek, and Yermack (1997) confirm the disciplinary role of debt. For these authors, companies become highly leveraged when their Market-to-book ratios are high, although many previous studies have found that companies are especially susceptible to issuing shares under these conditions. Further analysis of this study shows that companies with large Market-to-book ratios are more likely to issue new stocks and new debt. These results suggest that companies with high market values have many investment opportunities, which motivate them to raise funds from all kinds of sources. Furthermore, the authors also suggest that companies with a high Market-to-book index are also more likely to repurchase their own shares, and this effect explains the change in leverage, being positively associated with the variable in question.

Chen and Zhao (2006) found that companies with high Market-to-book ratios use more debt and companies with lower ratios use less. The results obtained indicate that companies with high Market-to-book ratios are more likely to issue shares to raise funds, as they obtain a lower cost of capital through external financing.

Almeida et al. (2011) used the Market-to-book index as a measure to capture companies' growth opportunities. More precisely, the authors analyzed whether companies with a Market-to-book index greater than 1 have more incentives to manage their results than companies with a Market-to-book index less than 1. Statistical tests indicate that companies with Market-to-book between 0 and 1, and especially above 1, have a positive relationship and a higher degree in the mean test with discretionary accruals than other groups of firms. Thus, companies with a Market-to-book greater than 1 have market incentives to manage results.

In summary, scientific research on capital structure has a long history, and is not restricted to those presented in this section. It is noticed that the results of researches are divergent and that there is still no unanimity regarding relationship with growth opportunities.

Then it comes the need to go deeper into this issue: to identify how capital structure is related to growth opportunities. In consequence, this research has the general hypothesis: H0 – There is a negative relationship between growth opportunities and indebtedness. Based on the theoretical foundation of the various studies presented, all variables have a theoretical foundation. The structure of the econometric model is elaborated by the authors and, as a differential, it uses the growth opportunity variables (Market-to-book and Tobin's Q) as dependents.

Research methodology

The quantitative character of the research can be observed by quantifying the data from the application of statistical instruments. The descriptive and documentary characters, on the other hand, are from the description of the results of such application, as well as the use of a document for data collection and analysis (Martins, & Theóphilo, 2009).

The population studied are Brazilian publicly-held companies. The non-probabilistic sample was selected by the intentionality criteria, meeting the following requirements: i) companies present in the list of publicly-held companies from [B]³; and ii) companies that were in the Economática® database in June 2021;

The data collected refer to companies that have (or had) shares traded on [B]3 during the period from 2009 to 2020. The secondary data for the study were obtained through the annually consolidated financial statements (Economática®): i) Market Value; ii) Net worth; iii) Current Liabilities; iv) Non-Current Liabilities; v) Current assets; vi) Total Assets; vii) Capex (Cash Flow Statement); viii) Net profit; e ix) Gross Revenue (Income Statement).

Table 1
Description of the variables of econometric models in the study

Indicator	Formula	Theoretical foundation
Market-to-book	$MB = \dfrac{Market\ Value}{Net\ Worth}$	Almeida et al. (2009), Bastos and Nakamura (2009), Bastos et al. (2009) and Rajan and Zingales (1995)
Tobin's Q	$Q = \dfrac{\substack{Market\ Value \\ +Current\ Liab. \\ +Non \\ Current\ Liab \\ -Current\ Assets.}}{Total\ Assets}$	Kim (2014), Shin e Stulz (2000) e Taghavi, Valahzaghard e Amirjahadi (2014)
Indebtedness	$END = \dfrac{\substack{Current\ Liabilities \\ +Non\ Currente\ Liabilities}}{Total\ Assets}$	Bastos e Nakamura (2009) e Cecon et al. (2017)
Capital Expenses	$CAPEX = \dfrac{Capex}{Net\ worth}$	Lima, Gonçalves, Bruni, Rocha, Dias (2016)
Size	TAM = Natural Logarithm (Total Assets)	Chen (2004) e Kim (2014)
Return on		Bastos et al.

assets	$ROA = \dfrac{\text{Net profit}}{\text{Total Assets}}$	(2009), Correa et al. (2013) e Rajan e Zingales (1995)
Revenue Growth	$RG = \dfrac{\text{Gross Revenue}(t) - \text{Gross Revenue }(t-1)}{\text{Gross Revenue}(t-1)}$	Lima et al. (2016)

Source: Elaborated by the authors (2022).

Subsequently, the multiple regression technique was used, using panel data with a stacked time series, with growth opportunities measured by the Market-to-book index and Tobin's Q as the dependent variable (explained). From the variables in Table 1 calculated in Excel®, two models were proposed, according to Equations (2) and (3):

Equation (2):
$$MB_{i,t} = \alpha + \beta_1 END_{i,t} + \beta_2 CAPEX_{i,t} + \beta_3 TAM_{i,t} + \beta_4 ROA_{i,t} + \beta_5 RG_{i,t} + \varepsilon_i$$

Equation (3):
$$Q_{i,t} = \alpha + \beta_1 END_{i,t} + \beta_2 CAPEX_{i,t} + \beta_3 TAM_{i,t} + \beta_4 ROA_{i,t} + \beta_5 RG_{i,t} + \varepsilon_i$$

Where:
$MB_{i,t}$ = Market-to-book of company i at time t.
$Q_{i,t}$ = Q de Tobin da empresa i no tempo t.
α = Line intercept.
β_1 a β_5 = Angular coefficients.
$END_{i,t}$ = Indebtedness of company i at time t.
$CAPEX_{i,t}$ = Proxy of company i's capital expenditures at time t.
$TAM_{i,t}$ = Size of company i at time t.
$ROA_{i,t}$ = Return on Assets of company i at time t.
$RG_{i,t}$ = Revenue growth of company i at time t.
ε_i = Error term.

The population had 4,740 observations and 395 companies, but many "missing values", so the exclusions presented in Table 2 were performed, resulting in 2,249 observations from 273 companies.

Table 2
Sample composition

Initial number of observations	4.740
(-) Exclusion of observations that did not present Market-to-book values	1.927
(-) Exclusion of observations that did not present Tobin Q´s values	220
(-) Exclusion of observations that did not present Proxy Capex values	288
(-) Exclusion of observations that did not present Revenue Growth values	56
Final number of observations	2.249

Source: Elaborated by the authors (2022).

The distribution of the studied companies between sectors, according to the classification available from Economática® (10 sectors), is highlighted in Table 3.

Table 3
Sample distribution between sectors

Sectors of the economy	N°	Percentage
Industrial Goods	46	16,85%
Communications	4	1,47%
Circular consumption	75	27,47%
Non-circular consumption	18	6,59%
Financial	26	9,52%
Basic materials	25	9,16%
Others	1	0,37%
Oil, gas and biofuels	9	3,30%
Health	18	6,59%
Information Technology	8	2,93%
Total	**273**	**100,00%**

Source: Elaborated from research data (2022).

As shown in Table 3, the most representative sectors in the sample, according to the classification of Economática®, are: circular consumption, industrial goods and financial, in that order. Together, these sectors correspond to 53.84% of the sample.

According to the theories studied, growth opportunities would be negatively or positively related to indebtedness, as shown in Table 4.

Table 4
Research hypotheses in relationship of growth opportunities with indebtedness

Specific indebtedness factors	Expected relationship of growth opportunities according to theoretical framework		
	Hypotheses (trade off theory)	Hypotheses (pecking order theory)	Assumptions (Agency theory)
Indebtedness	Negative	Negative/Positive	Negative/Positive

Source: Elaborated by the authors (2022).

Regarding the validation of assumptions of the panel data regression model, the Durbin-Watson, White and Shapiro-Wilk tests were used to verify the existence of autocorrelation, heteroscedasticity and normality of the data, respectively (Table 3). The Variance Inflation Factor (VIF) test was also used, which verifies the existence of multicollinearity on the sample data (Table 4). For data analysis, descriptive statistics of the data were used, as well as a Pearson correlation matrix and multiple regression of panel data by Ordinary Least Squares (OLS).

Results analysis

Validation of the Assumptions of Regression Models

Table 5 presents the statistics obtained with the regression-based specification tests.

Table 5
Specification tests for models 1 and 2

Test	Market-to-book (model 1)	Tobin's Q (model 2)
Durbin-Watson	1,124	0,336
White	0,000	0,000
Shapiro-Wilk	0,000	0,000
Probability (F statistic)	0,000	0,000
R2	0,263	0,124
Adjusted R2	0,261	0,122

Source: Elaborated by the authors (2022).

Durbin-Watson statistics close to two indicate the independence of residuals in the regression model, however do not reject the possibility of autocorrelation between the residuals in the model. The presence of heteroscedasticity was detected, with the result obtained with the White test. On the Shapiro-Wilk test (normality of residuals), it was found that the model has a non-normal distribution, since the significance found is less than 0.05. An F statistic very close to zero means that at least one of the explanatory variables is affecting the dependent variable. The coefficient of determination (R2) can range from 0 to 1. If the regression model is applied and estimated satisfactorily, the researcher can assume that the higher the R2, the greater the explanatory power of the regression, consequently, the better the prediction of the dependent variable (Hair, Black, Babin, Anderson, & Tatham, 2009). When analyzing the R^2 of the tests, it can be noticed that the model with Market-to-Book has a better explanation by the variables than the model with Tobin's Q.

Table 6 shows the results for VIF to test multicollinearity.

Table 6
Variance Inflation Factor Test (VIF)

	END	CAPEX	TAM	ROA	RG
VIF	1,148	1,008	1,066	1,112	1,036

Source: Elaborated by the authors from research data (2022).

The highest VIF was 1,148 for the Indebtedness variable. Myers (1990) considers that there are multicollinearity problems when VIF values are above 10. Therefore, the test results can be considered acceptable.

Descriptive Statistics of Variables

Table 7 shows the descriptive statistics of the sample.

Table 7
Descriptive statistics of variables

	Average	Median	Minimum	Maximum	Standard deviation
MB	2,920	1,550	0,078	150,000	7,520
Q	1,050	0,823	-0,306	10,500	0,925
END	0,556	0,566	0,008	1,000	0,200
CAPEX	0,494	0,106	0,000	478,000	10,400
TAM	8,200	8,210	2,730	13,800	1,690
ROA	0,037	0,040	-1,450	0,729	0,096
RG	0,241	0,090	-15,800	110,000	2,710

Source: Elaborated by the authors from research data (2022).

From the data shown, it is possible to observe that the largest standard deviation was Capex. However, in general, standard deviations are at acceptable levels, since all variables are a product of division, which mitigates the effect of outliers. The company that obtained the highest Capex was Telebras in the communications sector in 2014.

Correlation Matrix of Variables

Table 8 shows the correlation between the variables used in the study.

Table 8
Correlation matrix of independent variables

	END	CAPEX	TAM	ROA	RG
END	1,00				
CAPEX	0,08	1,00			
TAM	0,24	-0,02	1,00		
ROA	-0,25	-0,03	0,01	1,00	
RG	0,01	0,02	-0,02	-0,18	1,00

Source: Elaborated by the authors from research data (2022).

As can be seen, among the independent variables, the highest correlation was -0.25, remaining within the accepted level of correlation. For Hair et al. (2009), correlation values greater than or equal to 0.90, both positive and negative, indicate the presence of multicollinearity. In consequence, it was found that there is no multicollinearity between the study variables.

In general, the correction coefficients are low, however, there is a positive relationship between Capital Expenditure (CAPEX) and Revenue Growth (RG). Which reinforces the assumption that this type of investment would bring greater returns.

Determinants of Growth Opportunities

The analysis in this type of study focuses on the independent variables, explaining the relationship of growth opportunities with components of capital structure of a company, which is measured by the betas (coefficients) of

the regression.

Table 9
Estimation of Equation (2) by the Market-to-Book (MB) variable from 2009 to 2020

Variable	Coefficient	Standard Deviation	t-statistic	Probability	Significance
Constant	1,74	0,72	2,41	0,02	**
END	10,29	0,73	14,12	<0,0001	***
CAPEX	0,30	0,01	22,82	<0,0001	***
TAM	−0,62	0,08	−7,43	<0,0001	***
ROA	9,96	1,49	6,68	<0,0001	***
RG	0,04	0,05	0,83	0,41	

***, ** and * represent significant values at 1%, 5% and 10% respectively.
Source: Elaborated by the authors from research data (2022).

The variable Indebtedness was shown to be positively related to the Market-to-book index with a coefficient of 10,294, which contradicts the relationship expected by the theoretical review. As companies' indebtedness grows, companies would have greater growth opportunities. The ROA ratio is also highly positively related to the growth opportunities measured by Market-to-Book. Great returns seem to be related to great growth opportunities.

Even so, it was significant at the 1% level for all variables, with the exception of revenue growth which was not significant. Analyzing the coefficients, what is remarkable is the fact that the size variable was the only one that showed a negative sign, which corroborates the hypothesis that the larger the size of the company, the smaller its growth opportunities.

Table 10
Estimation of Equation (3) by Tobin's Q variable (Q) from 2009 to 2020

Variable	Coefficient	Standard Deviation	t-statistic	Probability	Significance
Constant	0,88	0,09	9,10	<0,0001	***
END	0,09	0,09	0,99	0,32	
CAPEX	0,01	0,01	0,29	0,77	
TAM	−0,01	0,01	−0,11	0,84	
ROA	3,49	0,11	17,45	<0,0001	***
RG	0,02	0,01	2,55	0,01	**

***, ** e * representam valores significativos a 1%, 5% e 10% respectivamente.
Source: Elaborated by the authors from research data (2022).

The variable Indebtedness was shown to be positively related to Tobin's Q with 0.0002, validating the Pecking Order Theory and Agency Theory. The study of Kim (2014),

the relationship found in European companies between Tobin's Q and Indebtedness is also positive, but more expressive and with a significance level of 5%.

The significance was 1% for ROA and 5% for Revenue Growth. It was also observed that the highest coefficient was ROA of 3.488. High returns seem to be related to great growth opportunities, similar to what was observed in model 1.

Another remarkable fact is that the coefficients showed the same signs in both regressions, that is, the only variable that showed a negative coefficient was Size, supporting the hypothesis that the larger the size of the company, the smaller its growth opportunities.

Final considerations

In the last 50 years, several studies on capital structure have been performed around the world, making this question challenging and instigating, as there is still no concrete certainty regarding the explanation of the indebtedness of companies (Bastos & Nakamura, 2009). Thus, the aim of this research was to investigate whether companies' indebtedness influences their growth opportunities. The proxies used in this study for growth opportunities were Market-to-book and Tobin's Q, widely used in the literature. Two regressions were carried out in a sample of 273 Brazilian publicly-held companies during the period from 2009 to 2020.

The Market-to-book model had better results than Tobin's Q model by the chosen variables. In both models, indebtedness and return on assets (ROA) were the variables with greater sensitivity to growth opportunities. Indebted companies presented better growth opportunities. It was also noted that the size of a company does not seem to be beneficial to growth opportunities. Capital Expenditure (CAPEX) showed relevance in the Market-to-Book model and Revenue Growth (RG) in Tobin's Q model.

In conclusion, this research shows that indebtedness cannot be disregarded when it comes to determining growth opportunities, as it is a factor that helps explaining this behavior. Thereby H0 (There is a negative relationship between growth opportunities and indebtedness) it cannot be confirmed in the Brazilian reality. However, it is clear that the Brazilian market has several differences in relation to other capital markets. Given that the number of listed companies is reduced and there may be several other endogenous or exogenous factors that reflect adequately growth opportunities.

The expectancy of this research is that it can contribute in some way to increasing the understanding of both growth opportunities and capital structure in Brazil. It should be noted, however, that its results should not be generalized to all companies, given the data limitations and the non-compliance to all the best statistical practices of the degree of correlation and explanatory power of regressions (R2) in studies of this type.

Therefore, for future research, it is suggested to control sub-samples for different indebtedness levels and analyze whether leverage is an important determinant of

growth opportunities. The sample could also be divided into sub-periods, so the moments of economic instability that occurred in the country during the period studied can be better analyzed.

Another suggestion for future studies is the use of other explanatory variables, as well as the inclusion of other control variables. The literature points to some such as the variation in sales, research and development. Therefore, it is important to emphasize the importance of using other variables that represent growth opportunities in future research, aiming to analyze the consistency of the results obtained in this study.

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